IS THE USE OF HERBICIDES IN LIMITED WAR JUSTIFIED

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SUMMARY

This essay reviews the development of opposition to the use of herbicides in Vietnam from the military, scientific, political, and legal standpoint. Although the opposition seems to rest on scientific speculation and strained legalities, this rather humane weapon has been discontinued. The United States' policy presently is to suspend the use of herbicides and take action that appears to outlaw the use in future wars.

IS THE USE OF HERBICIDES IN LIMITED WAR JUSTIFIED?

Limited warfare is bound to have long-range effects on non-combatants and the environment of the area of operations, in addition to the immediate effects of combat. Saturation bombing and the use of napalm can alter the local terrain and vegetation for years to come; clearing of large areas of farm or forest lands for roads, base camps, depots, etc., will make permanent or semi-permanent alterations to the environment; thousands of refugees will be on the run suffering from starvation and disease, many never to return to their homes. But for potential large-scale and long-range effects, herbicide operations such as conducted on millions of acres of forest and farmlands during the last eight years in Vietnam seemingly dwarf other limited war weapons.

The use of herbicides has created considerable controversy in the conduct of this most controversial war in Vietnam. Similar limited war use for defoliation or crop destruction in other areas of the world may some day be desirable even though most of the herbicide operations are now suspended in Vietnam.

The attractiveness of the use of herbicides in areas of heavy vegetation is readily understood. Large areas can be treated very rapidly by spraying from aircraft. Amazingly small quantities of a few pounds of herbicide per acre provide the treatment desired. Thus enemy ambush positions can be more easily detected, concealed routes and camps can be revealed, enemy food crops can be destroyed,

and friendly fortifications can be made more effective. As Lt. Colonel Sampson H. Bass, Jr., has reported in his thesis on Chemical Herbicides:

> "Defoliation in the Republic of Vietnam has assisted in the successful conduct of Allied Military Operations. Casualty rates have been reduced, economy of force measures have resulted, and the movement of supplies has been facilitated."[1]

The military use of herbicides in Vietnam continued for over eight years and was considered successful and in demand by tactical commanders. The short-term benefits were regarded as overwoighing the risks such as accidental spray drift into rubber plantations or rice fields which were in friendly hands. Long-term unwanted side effects seemed to be negligible. After all, once a decision has been made to fight a war much unpleasantness ensues and, compared to most weapons of war, herbicides score pretty high on a scale for humaneness. Obviously from the large variety of weapons available, herbicides are but one and not predominant.

Nevertheless the question of unknown long-term, detrimental, environmental effects persists, and within both the scientific and political communities opinion is widely divided on the effectiveness or dangers involved in herbicide use. Does such use violate international law? Can such use be justified as a valid weapon of

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[1]Sampson H. Bass, Jr., *Chemical Herbicides--A New Dimension in Chemical Operations.* Thesis (Carlisle Barracks: US Army War College, 1969) p. 17(U).

limited war? Do the non-combatents suffer more than the enemy?

The defoliants or herbicides used in Vietnam by the U. S. Air Force are described as follows:

Orange - a 50-50 mix of n butyl esters of 2,4-D and 2,4,5-T.

White - a mixture of picloran and 2,4-D.

Purple - 50% n butyl ester 2,4-D, 30% n butyl ester 2,4,5-T, and 20% isobutyl ester 2,4,5-T

Blue - cacodylic acid.[2]

Orange is used for jungle defoliation; White for woody plants, Purple for general use, and Blue for grass and rice destruction.[2] Up to May 1969 the U. S. Air Force had defoliated 4,119,960 acres and killed crops on 468,559 acres, including repeats on some areas.[3]

2,4-D and 2,4,5-T are selective, translocated phenoxy herbicides used mainly in post-emergence applications.[4]

Picloram is a picolinic acid, a somewhat selective, translocated pre- and post-emergence herbicide.[5]

Cacodylic acid is an organic arsenical compound used as a non-selective post-emergence herbicide.[6]

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[2]Richard D. McCarthy, *The Ultimate Folly* (Alfred A. Knopf, New York, 1969), p. 76.
[3]Ibid., p. 79.
[4]W. T. Thomas, *Agricultural Chemicals, Book II - Herbicides, 1967 Revision* (Thomas Publications, P. O. Box 989, Davis, California 95616), pp. 1 and 5.
[5]Ibid., p. 129.
[6]Ibid., p. 208.

The use of 2,4-D and 2,4,5-T predominate in Vietnam. As A. S. Crafts notes in 1961 in his book on The Chemistry and Mode of Action of Herbicides:

> "When the hormone-like compounds 2,4-D and 2,4,5-T were announced in 1944..., a new era in use of agricultural chemicals was ushered in" and "2,4-D not only killed plants by contact action..., it was selective..., it was nontoxic to man and animals; and it was a cheap and potent chemical...."[7]

The killing power of such a compound seems to work through the enzyme systems of plants but "many enzyme systems have been studied in the search for the mode of action of 2,4-D and to date [1961] no specific system has been identified."[8]

Many studies were made of 2,4-D and 2,4,5-T to establish the dangers of widespread use in agriculture to man, animals, fish, and wildlife. Glenn C. Klingman in 1961 in his book on Weed Control: As a Science reported the results of research studies, noting that tests indicated no harm and "The hazard to livestock and wildlife associated with the use as recommended of herbicides containing 2,4-D [and] 2,4,5-T is negligible."[9]

Klingman also stated that, "At usual herbicidal rates, 2,4-D is harmless to fish."[10] Thus at the time that defoliation and

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[7]A. S. Crafts, *The Chemistry and Mode of Action of Herbicides* (Interscience Publishers, Inc., 250 Fifth Avenue, New York, N. Y., Copyright 1961), p. 52.

[8]Ibid., p. 4.

[9]Glenn C. Klingman, *Weed Control: As a Science* (John Wiley & Sons, Inc., New York, N. Y., Copyright 1961), p. 139.

[10]Ibid., p. 139.

crop destruction programs were being initiated in Vietnam, scientific textbooks on herbicides gave reasonable assurance that unwanted detrimental effects were minimal. The widespread use of herbicides in the United States for agricultural purposes became a billion dollar business. Modern U. S. agriculture probably could not survive without such aids to weed control.

Nevertheless, much criticism was leveled at the Vietnamese herbicide operation as exemplified by an article by Arthur W. Galston in a special issue of the periodical Scientist and Citizen of August-September 1967, in which he said:

> "We are too ignorant of the interplay in ecological problems to know how far-reaching and how long-lasting will be the changes in ecology brought about by the widespread spraying of herbicides in Vietnam. These changes may include immediate harm to people in the sprayed areas and may extend to serious and lasting damage to soil and agriculture - rendering more difficult South Vietnam's recovery from war regardless of who is the 'victor.'"[11]

This kind of criticism seemed to be more speculation and perverse hope than well-founded scientific analysis, considering the experience with U. S. agriculture over a period of almost 20 years.

To evaluate this kind of attack on the operation, the Armed Forces contracted with the Midwest Research Institute, which put out a report in December 1967 entitled Assessment of Ecological Effects of Extensive or Repeated Use of Herbicides. In this report

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[11] Arthur W. Galston, "Changing the Environment," *Scientist and Citizen* (A Special Issue, Vol. 9, No. 7, Aug-Sep 1967), p. 125.

several conclusions were reached, among which were that 2,4-D and 2,4,5-T persist in the soil only one to three months,[12] that the possibility of harm to wildlife or man is extremely unlikely, and the toxic transfer to the next higher animal in the food chain is minimal.[13] This assessment points out that 2,4,5-T because it acts on hardwoods with little injury to conifers, has been used on U. S. forests to control hardwood encroachment on pine lands of the Southeast,[14] and has been used to open areas in forests for the increase of wildlife and to provide browse without serious direct effects on wildlife.[15]

Because the slash and burn technique of farming is used extensively in Southeast Asia, much of the forests have already been altered considerably by man. Still in remote areas large stands of virgin forests exist. Fred H. Tschirley continued the discussion of the use of herbicides in an article in the periodical Science of 21 Feb 69, entitled "Defoliation in Vietnam," in which he described the recovery of mangrove areas as having started six years after the trees were killed and made the estimate that it would take about 20 years for the forest to return to its original condition.[16] In areas of secondary forests where deciduous trees were killed, bamboo invasion is a danger.[17]

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[12]House, Goodson, Gadberry, Dockter, *Assessment of Ecological Effects of Extensive or Repeated Use of Herbicides* (Final Report 15 Aug-1 Dec 67, Midwest Research Institute Project No. 3103B, sponsored by ARPA), p. 709.

[13]Ibid., p. 291.

[14]Ibid., p. 57.

[15]Ibid, p. 70.

[16]Fred H. Tschirley, "Defoliation in Vietnam," *Science*, (Vol., 163, No. 3869, 21 Feb 69) p. 783.

[17]Ibid., p. 784.

The uncertainties of the long-term effects and the unknown dangers to mankind led Congressman Richard D. McCarthy to deplore the use of herbicides or chemical warfare in his book The Ultimate Folly[18] in 1969.

In 1966 Bionetics Research Laboratories in Bethesda, Maryland, discovered that 2,4-D and 2,4,5-T have the ability to cause birth defects in rats and mice. This teratogenic influence was made known to the Food and Drug Administration in October 1968, and additional tests were conducted on 2,4-D and 2,4,5-T and dioxin impurities in 2,4,5-T. Again the results showed the danger, and the President's Science Advisor announced on October 1969 that restrictions on 2,4,5-T were imminent. On 15 April 1970 certain uses of 2,4,5-T were suspended by the Department of Agriculture and at the same time the Department of Defense suspended use of 2,4,5-T in Vietnam. The entire defoliation program was later suspended in Vietnam.[19]

The above rather incomplete accounting of the charges and countercharges on herbicide use points up the extreme difficulties in evaluating the dangers of use. Apparently, so far, no human birth defect has been traced to contact by the mother with herbicides, and it may be impossible to do so. Apparently little direct

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[18] McCarthy

[19] Samuel S. Epstein, "A Family Likeness"(and associated editorial comment) *Environment* (Vol. 12, No. 6, Jul/Aug 1970), pp. 22-23.

effect on fish and wildlife has been discovered. But the killing of vast areas of forests or other vegetation, where recovery times are as slow as twenty years and where the likelihood exists that less desirable replacement vegetation moves in, obviously creates conditions that cause fish and wildlife changes, whether such changes are good or bad. When gross environmental changes result unintentionally, a natural concern exists that the changes are going to be bad even when it is recognized that the environment is naturally constantly changing.

Since the degree of unwanted damage caused by herbicides is unknown, an analysis of benefits versus costs of the herbicide operation consists of a great deal of speculation. Nevertheless, considering the death and destruction caused by other weapons of war, herbicide dangers appear to be rather mild.

A different attack has been made on one phase of the herbicide operation, that is, crop destruction. Here the argument is that the operation is not only ineffective but it backfires by creating a flood of refugees. As stated by Jean Mayer in an article "Starvation as a Weapon":

> "It is clear...that food denial in war affects the fighting men least and last, if at all. ...It is hardest on civilians, particularly children and the elderly; where economic class distinctions are sharp, it is particularly hard on the poor."[20]

> "From a military viewpoint, the attempt to starve the Viet Cong can be expected to have little or no effect. What it can be expected to do is to add to the flow of refugees already far beyond the capacity of the program designed to care for them."[21]

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[20]Jean Mayer, "Starvation As a Weapon," *Herbicides in Vietnam* (Scientist and Citizen, A Special Issue, Vol. 9, No. 7, Aug-Sep 67), p. 119.

[21]Ibid., p. 121.

What Mr. Mayer seems to ignore is that the Viet Cong must spend considerable time in supplying themselves with food and if this becomes more and more difficult, they become less and less effective as a military force. The creation of refugees has some advantages because the refugees come under full control of the government once they are placed in a refugee camp. If they can be returned to their homes after a short refugee status, the government gains. If, however, refugee status becomes permanent, the problem for the government escalates and the advantages diminish.

As described by Lt. Colonel Bass:

> "In summary, the availability of foodstuffs bears a direct relationship to the extent to which an insurgent force can be effective. As shown by the experience in the Republic of Vietnam, chemical crop destruction can provide an excellent means of limiting the insurgent's food supply, disrupting tactical operations and creating significant morale problems. Finally the crop destruction program has resulted in some political gains for the Government of Vietnam by promoting alienation of the local populace by the Viet Cong."[22]

Here the military commander has a good idea of the reaction the crop destruction program will have. Crops can be replanted the next season so that recovery of agricultural lands is not a long-range problem. The flow of refugees can be anticipated and measures taken for their care. If, however, vast croplands were to be destroyed

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[22] Bass. p. 34 (U)

in areas where non-combatants had no relief, then the weapon of starvation would require much more critical analysis from a humanitarian standpoint.

Finally, the aspect of International Law needs to be evaluated. The 1925 Geneva Protocol prohibited Chemical Warfare. The United States signed the Protocol, but when presented to the U. S. Senate for ratification in 1926, the Senate referred it back to the Foreign Relations Committee where it languished until withdrawn by President Truman in 1947.[23] The use of tear gas and herbicides in Vietnam resulted in repeated charges by politicians and scientists of the United States and by other nations that such use violated the Protocol and international law.

U. Thant, Secretary General of the United Nations, in 1969 in a report to the UN on chemical and biological warfare, urged members "to make a clear affirmation that the prohibition contained in the Geneva Protocol applies to the use in war of all chemicals, bacteriological and biological agents (including tear gas and other harassing agents) which now exist or may be developed in the future."[24]

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[23]Senator Charles E. Goodell,"Targets for Further Disarmanent: CBW"(Policy Paper published by the Center for International Studies, New York University, Summer 1969, as republished by the Congressional Record 25 November 1969), p. S 15031.

[24]Jozef Goldblat, "Are Tear Gas and Herbicides Permitted Weapons?" *Science and Public Affairs Bulletin of the Atomic Scientists*, Vol. 26, April 1970, p. 16.

In December 1969, the General Assembly voted 80 to 3 that the Protocol bans tear gas and herbicides.[25]

The United States has had reservations to the Protocol in the use of such agents as tear gas, which are commonly used by police or in the use of defoliants. Ambassador Nabrit, before the UN General Assembly in 1966, stated:

> "The Protocol does not apply to herbicides, which involve the same chemicals and have the same effects as those used domestically in the United States, the Soviet Union, and many other countries to control weeds and unwanted vegetation."[26]

On 19 August 1970, President Nixon sent the Geneva Protocol to the Senate for ratification. Without stating any reservations for the use of herbicides, the President in his message to the Senate stated that he considered "it essential that the United States now become a party to this Protocol...."[27] On 2 October 1970, Senator Fulbright, Chairman of the Senate Committee on Foreign Relations, stated he wished to hold hearings on the ratification but did not set dates for such.[28]

Thus in 1970, the United States has suspended the use of herbicides in Vietnam and the President has sought to ratify the Geneva Protocol without express reservations. A weapon, widely

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[25]Robert M. Smith, "Capitol Warned of Gas Warfare Pact," *New York Times*, 22 July 1970, p. 4.
[26]Goodell, p. S 15032.
[27]*Congressional Record*, August 19, 1970, p. S 13706.
[28]*Congressional Record*, October 2, 1970, p. S 17016.

used and vital to food production in the world, is considered too dangerous for warfare. And so the United States has indirectly decided that this weapon, very efficient from many standpoints, is a little too unpredictable to be a valid tool in the limited war arsenal of weapons; that in effect it is too controversial from the international law standpoint to use at this time and that non-combatants may suffer to the extent that its use is unwise.

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BIBLIOGRAPHY

1. Bass, Lt. Colonel Sampson H., Jr. *Chemical Herbicides--A New Dimension in Chemical Operations.* Thesis. Carlisle Barracks: US Army War College, 1969.

2. Crafts, A. S. *The Chemistry and Mode of Action of Herbicides.* Interscience Publishers, Inc., 250 Fifth Avenue, New York, N. Y. Copyright 1961.

3. Epstein, Samuel S. "A Family Likeness" (and associated editorial comment), *Environment*, Vol. 12, No. 6, Jul-Aug 1970, pp. 22-23.

4. Fulbright, Senator J. W. *Congressional Record, October 2, 1970*, p. S 17016.

5. Galston, Arthur W. "Changing the Environment," *Scientist and Citizen. A Special Issue, Vol. 9, No. 7*, Aug-Sep 1967, p. 12..

6. Goldblat, Jozef. "Are Tear Gas and Herbicides Permitted Weapons?" *Science and Public Affairs Bulletin of the Atomic Scientists*, Vol. 26, April 1970, p. 16.

7. Goodell, Senator Charles E. "Targets for Further Disarmament: CBW." Policy Paper published by the Center for International Studies, New York University, Summer 1969, as republished by the Congressional Record, 25 November 1969, p. S 15031.

8. House, Goodson, Gadberry, Dockter. *Assessment of Ecological Effects of Extensive or Repeated Use of Herbicides.* Final Report 15-Aug-1 Dec 67, Midwest Research Institute Project No. 3103B, sponsored by ARPA.

9. Klingman, Glenn C. *Weed Control: As a Science.* John Wiley & Sons, Inc., New York, N. Y. Copyright 1961.

10. McCarthy, Richard D. *The Ultimate Folly.* Alfred A Knopf, New York, 1969.

11. Mayer, Jean. "Starvation As a Weapon," *Herbicides in Vietnam.* Scientist and Citizen, A Special Issue, Vol. 9, No. 7, Aug-Sep 67, p. 119.

12. Nixon, President Richard M. *Congressional Record*, August 19, 1970, p. S 13706.

13. Smith, Robert M. "Capitol Warned of Gas Warfare Pact," *New York Times*, 22 July 1970, pp. 1 and 4.

14. Thomas, W. T. *Agricultural Chemicals, Book II - Herbicides, 1967 Revision.* Thomas Publications, P. O. Box 989, Davis, California 95616.

15. Tschirley, Fred H. "Defoliation in Vietnam," *Science*, Vol. 163, No. 3869, 21 February 1969, p. 783.